CHAPTER 4

HIV AND HEPATITIS C

HIV

HIV BACKGROUND

Human Immunodeficiency Virus (HIV) was identified over 30 years ago. Left untreated, HIV will lead to acquired immunodeficiency syndrome (AIDS). Untreated individuals become increasingly susceptible to opportunistic infections such as pneumonia, cytomegalovirus, tuberculosis, and various cancers. HIV is transmitted through contact of infected blood, semen, vaginal fluid, or breast milk through mucous membrane, abraded skin, or needle penetration. HIV is most frequently transmitted through anal and vaginal sex, and needle sharing. The virus can also be passed from mother to child, either during pregnancy/delivery or through infected breast milk.[1]

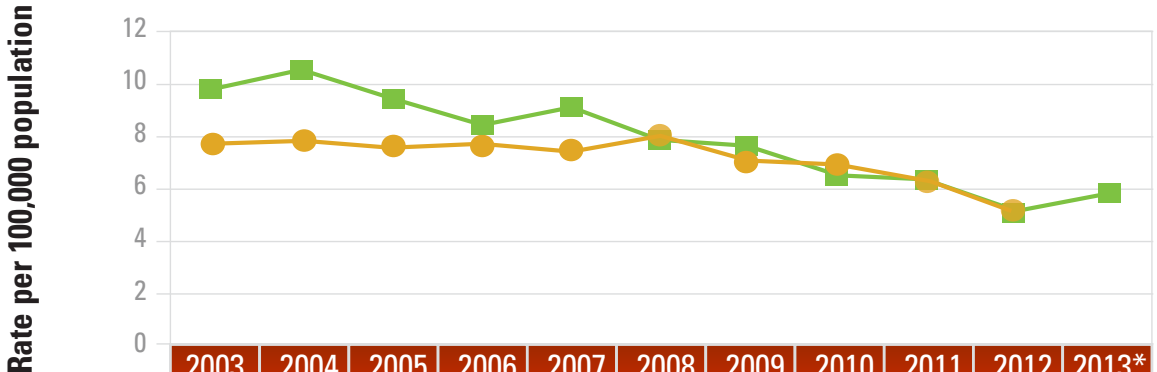
Once considered a terminal illness, HIV is now regarded as a chronic illness. A 20-year-old HIV-positive individual taking appropriate doses of antiretroviral treatment (ART) can survive through his/her early 70s. Even though there is no cure for HIV, ART can prevent the replication of the virus and suppress the viral load to undetectable levels. This improves the health of the infected individual, as well as minimizing the risk of spreading the infection.[48]

Even though HIV is treatable today, it is estimated that 27% of HIV infected individuals in Canada do not know their infection status (not tested or not received their result).[49] The BC Centre for Excellence's Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS) project has expanded HIV testing, treatment, and support services.[50] STOP HIV/AIDS was implemented initially in NH and VCH in 2010, but was expanded in 2013 to include all health regions in BC.[50] This program has led to an increase in HIV testing and increased identification of HIV cases.

HIV TREND

There are approximately 1.3 million people living with HIV (PLHIV) in North America; 71,300 of these cases are in Canada.[51,52] BC is estimated to have 11,700 HIV-positive individuals, which comprises 16.4% of those infected in Canada.[6] Newly identified HIV cases in BC have declined considerably since 2004 (Figure 4.1). In 2010/11, the BC rate was lower than the Canadian rate for the first time. In 2012 BC reported its lowest annual diagnosis count (237); but this subsequently increased in 2013. This increase may reflect the expanded testing.

Figure 4.1 **New HIV diagnosis in BC and Canada 2003-2013[54]**

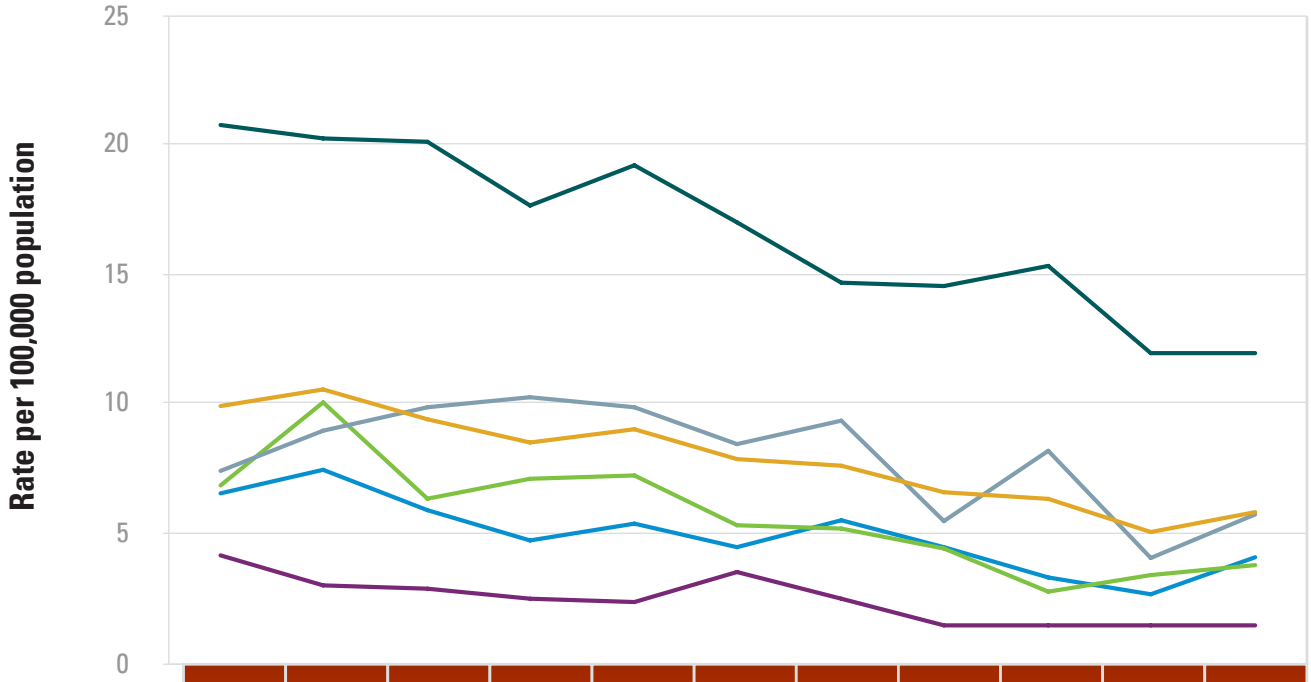


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
BC Diagnoses	408	442	400	361	391	345	337	300	288	237	272
BC Rate	9.9	10.6	9.5	8.5	9.1	7.9	7.6	6.6	6.3	5.1	5.8
Canadian Rate	7.8	7.9	7.7	7.8	7.5	7.9	7.2	6.9	6.4		

*2012 and 2013 Canadian rates are not available. 2013 BC diagnoses and BC rates are preliminary and subject to change (BCCDC Clinical Prevention Services Division, personal communication, May 13, 2014)

Figure 4.2 presents HIV diagnoses by HA by year. VCH had the highest rate of HIV diagnosis during the previous ten years but, similar to the provincial picture, has declined over the last decade with a slight increase in 2013. NH has the second highest rate of diagnosis, at 5.8 per 100,000 population in 2013.

Figure 4.2 New HIV diagnoses in BC by HA, 2003-2013[54]



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
FH	6.6	7.5	6.0	4.8	5.4	4.5	5.5	4.5	3.3	2.7	4.1
VCH	20.8	20.3	20.2	17.7	19.3	17.0	14.7	14.6	15.4	12.0	12.1
VIHA	6.9	10.1	6.3	7.1	7.3	5.3	5.2	4.4	2.8	3.4	3.8
IH	4.2	3.0	2.9	2.5	2.4	3.6	2.5	1.5	1.5	1.6	1.7
NH	7.4	9.0	9.9	10.3	9.9	8.5	9.4	5.5	8.2	4.1	5.8
BC	9.9	10.6	9.5	8.5	9.1	7.9	7.6	6.6	6.3	5.1	5.8

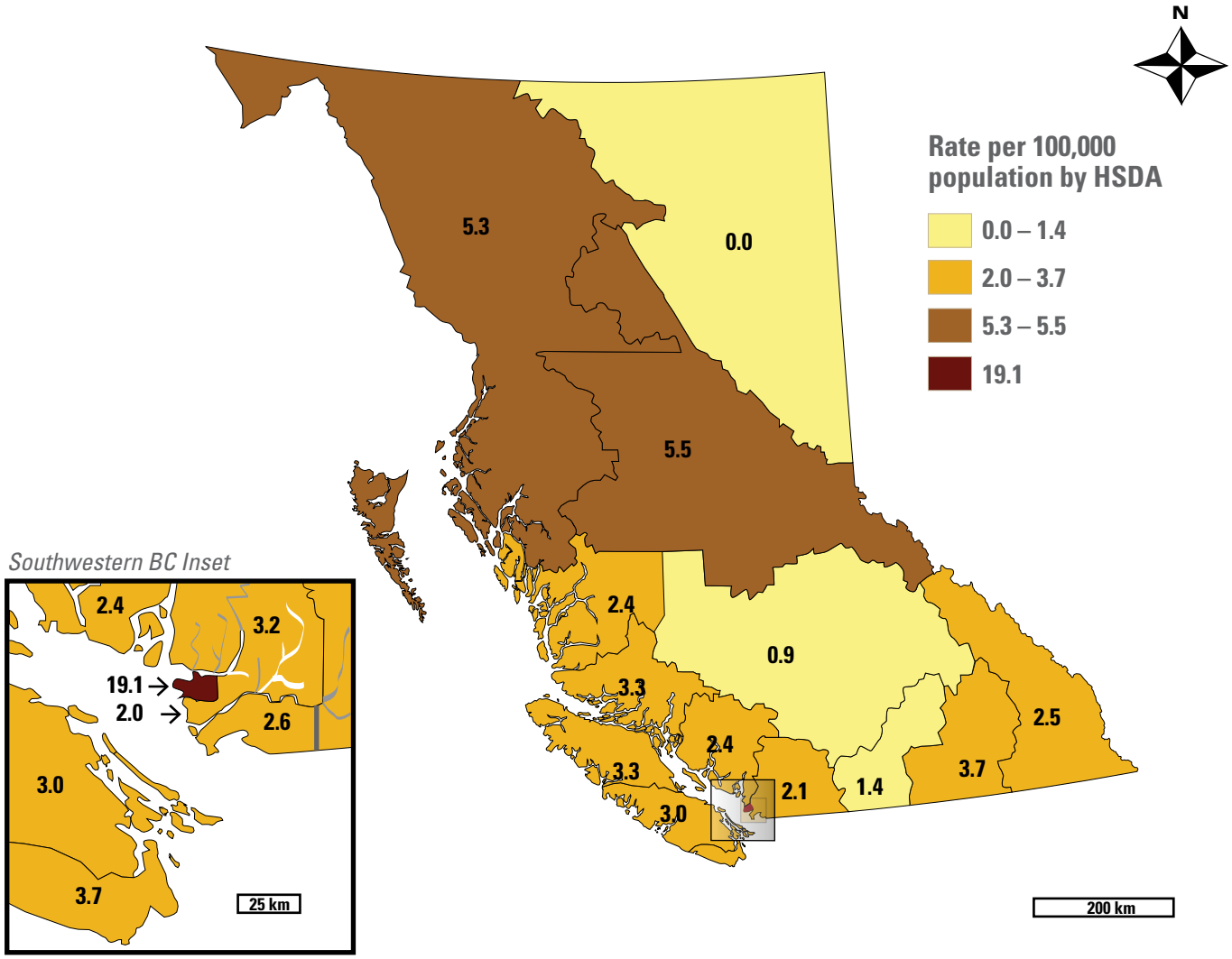
*2013 BC diagnoses and BC rates are preliminary and subject to change

(BCCDC Clinical Prevention Services Division, personal communication, May 13, 2014)

DEMOGRAPHICS OF HIV CASES IN BC

Detailed HIV data for 2013 is not yet available except for sex; therefore, we report 2012 data for geographic, age, and ethnicity where it is the latest available. As shown in Figure 4.3, Vancouver HSDA had the highest HIV incidence rate in 2012, at 19.1, followed by Northern Interior and Northwest HSDA, at 5.5 and 5.3 respectively. However most HSDAs outside the BC lower mainland had less than15 cases reported in 2012 so HIV incidence rates may be unstable.

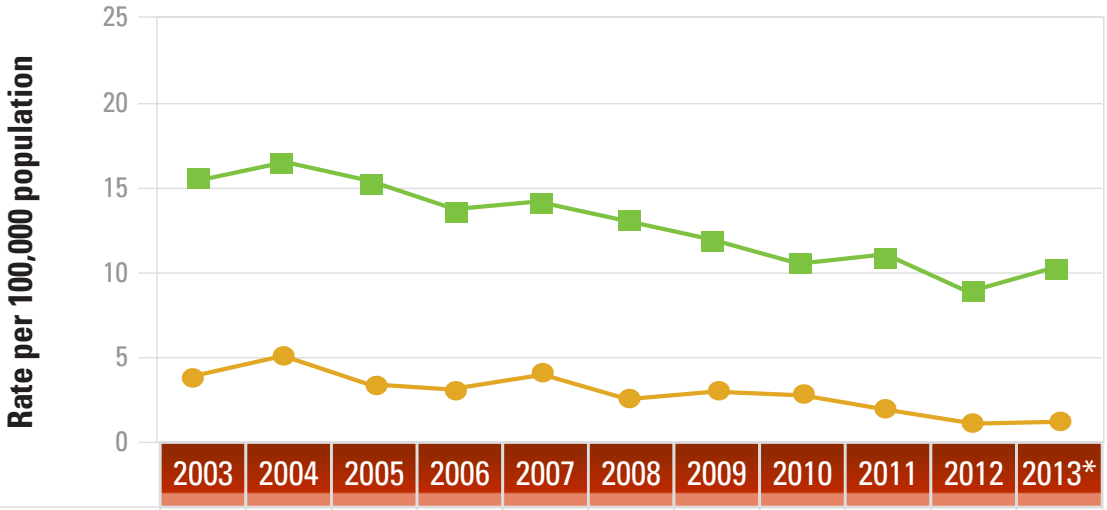
Figure 4.3 **New HIV diagnosis in BC by HSDA, 2012[54]**



HSDA	Rate	Cases	HSDA	Rate	Cases	HSDA	Rate	Cases
11 East Kootenay	2.5	2	23 Fraser South	2.6	19	43 North Vancouver Island	3.3	4
12 Kootenay Boundary	3.7	3	31 Richmond	2.0	4	51 Northwest	5.3	4
13 Okanagan	1.4	5	32 Vancouver	19.1	131	52 Northern Interior	5.5	8
14 Thompson Cariboo Shuswap	0.9	2	33 North Shore/Coast Garibaldi	2.4	7	53 Northeast	0	0
21 Fraser East	2.1	6	41 South Vancouver Island	3.7	14			
22 Fraser North	3.2	20	42 Central Vancouver Island	3.0	8			

Sex distribution of BC cases is shown in Figure 4.4. Overall, there has been a steady decrease in HIV rate in both sexes, but males continue to exhibit much higher (5-10 times) infection rates compared to females. This is largely explained by higher rates among men who have sex with men (MSM).

Figure 4.4 HIV diagnoses in BC by sex, 2003-2013[54]*



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
Rate - Male	15.7	16.4	15.5	13.7	14.2	13.2	12	10.6	10.8	9.1	10.3
Rate - Female	4.2	5	3.6	3.4	3.9	2.7	3.2	2.7	1.9	1.2	1.4
Diagnoses - Male	320	337	322	289	303	286	266	238	245	208	239
Diagnoses - Female	87	105	77	72	85	59	71	62	43	29	33
Diagnoses - Other**	1	0	1	0	3	0	0	0	0	0	0

*2013 BC diagnoses and BC rates are preliminary and subject to change

**Other – transgender and gender unknown

(BCCDC Clinical Prevention Services Division, personal communication, May 13, 2014)

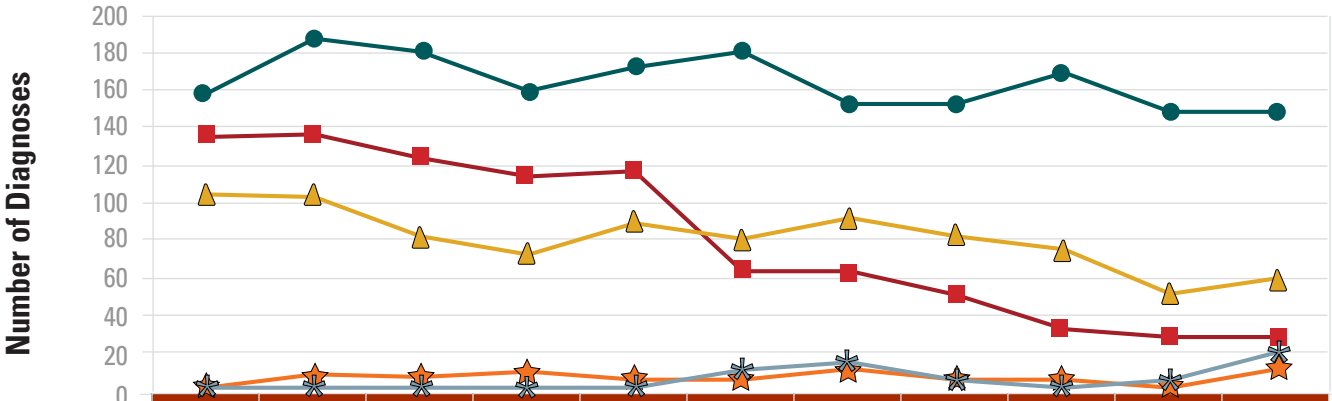
HIV AND ABORIGINAL POPULATIONS

According to Statistics Canada census data Aboriginal peoples comprise 5% of the BC population, but in 2003 they represented 16.2% of newly diagnosed HIV cases; this proportion reduced to 12.6% in 2012. From 2003 to 2012, between 29 and 60 HIV cases per year were reported among First Nations people and ten or fewer cases annually in people who identified Métis or Inuit heritage. In 2012, there were 29 HIV diagnoses among First Nations people; 18 males, 11 females; 18 (62.1%) were in VCH and 5 (17.2%) in NH. Rates of HIV diagnosis in both First Nations women and men (15.9 and 26.8 per 100,000) exceed those of women and men of all other ethnicities (1.2 and 9.1 per 100,000) in BC. The highest rate of new HIV diagnosis among First Nations people by age group is 30-39 years for men (61.0 per 100,000) and 25-29 years for women (53.6 per 100,000).[55]

HIV AND EXPOSURE CATEGORY

Figure 4.5 shows new HIV cases by exposure category in BC. It is notable that while injection drug use (IDU) was the most predominant mode of infection in the 1990's, MSM now comprise the largest group of new HIV cases followed by heterosexual contact.[1] Since 2007 there has been a rapid decline in infection rates in people who identify as injection drug users. Despite the increase in HIV diagnosis from 2012 to 2013, detection among PWID remained stable within that timeframe (29 cases for each year).

Figure 4.5 New HIV diagnoses in BC by exposure category, 2003-2013[54]



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
MSM	158	188	181	160	173	181	153	153	170	149	150
IDU	136	137	125	115	118	65	64	52	34	29	29
HET	105	104	82	73	90	81	92	83	75	52	60
Other	5	9	8	11	7	7	12	6	7	2	12
NIR/UNK	4	4	4	2	3	11	16	6	2	5	21

MSM > men who have sex with men **IDU** > injection drug use **HET** > heterosexual contact
NIR > no identified risk **UNK** > exposure unknown **Other** > blood/blood products, occupied perinatal, and other exposures

*2013 BC diagnoses and BC rates are preliminary and subject to change
(BCCDC Clinical Prevention Services Division, personal communication, May 13, 2014)

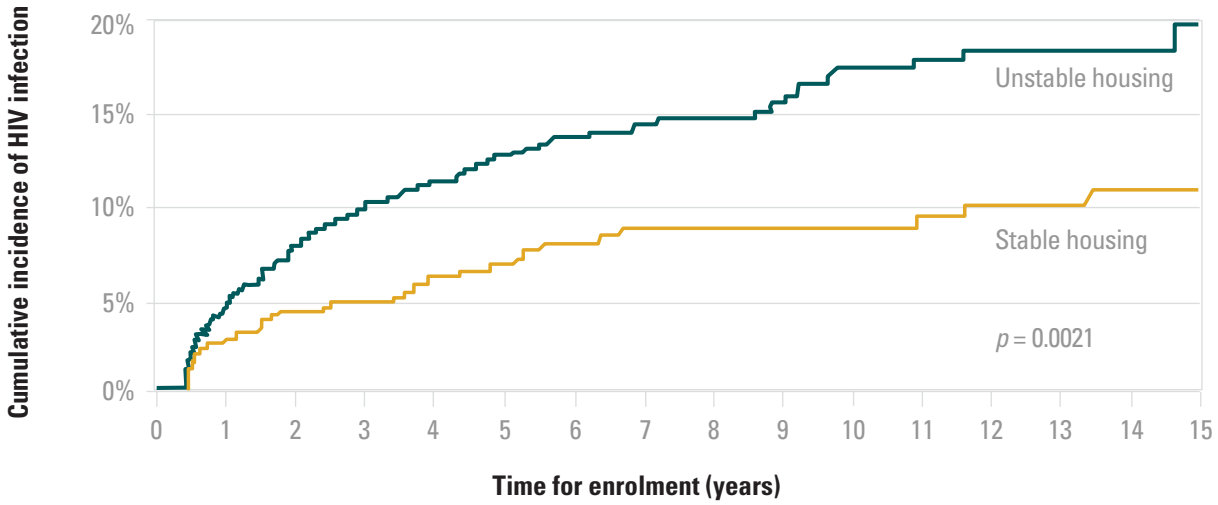
The reduction in HIV infection rates associated with injection drug use is far greater than that associated with other risk factors. This can be explained by several factors including:

1) the expansion of provincial harm reduction programs such as safer injection supply distribution, methadone maintenance programs and the supervised injection site in Vancouver;
2) the shift from injection drugs to non-injection drugs, which has a lower risk of HIV transmission when sharing paraphernalia; and
3) the expanded uptake of and adherence to ART which is associated with a reduction in the community viral load.

These public health prevention programs have contributed to the reduction in HIV associated with injection drug use and should be sustained and expanded.[55]

Research from UHRI shows after 15 years of follow-up unstably housed PWID were nearly twice as likely to become infected with HIV compared to PWID with stable housing (22% and 11.6% respectively) (Figure 4.6).[18]

Figure 4.6 **Cumulative incidence of HIV infection among PWID in Vancouver, 1996-2011, stratified by housing status[57]**



HIV TREATMENT

Although there is no cure or vaccine available for HIV today, ART can improve and maintain the health of PLHIV and prevent the spread of infection. Improving HIV testing through healthcare services is a crucial step to ensuring ART success. In 2010 BC adopted the pilot STOP HIV/AIDS program in Vancouver's DTES and NH; in 2013 the program was implemented as an official provincial five-year program. The STOP HIV/AIDS program aims to expand HIV testing, treatment, and support services to clinically eligible individuals in BC, and places an emphasis on engaging hard-to-reach.[50] Since the implementation of this program, BC's HIV testing rate has rapidly increased, especially in VCH, as illustrated in Figure 4.7. In Vancouver, which has the highest concentration of HIV cases in BC, the expanded uptake is associated with a lower community viral load among all HIV positive patients (Figure 4.8).[57]

Figure 4.7 **Rate of HIV testing in BC and HAs, 2009-2013[58]**

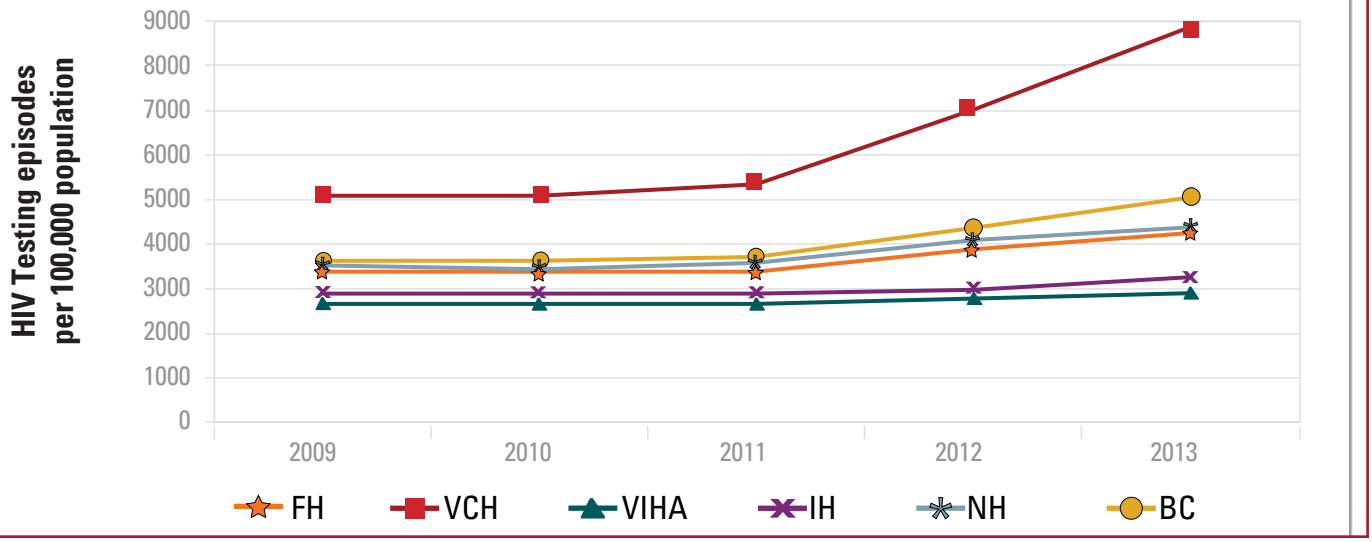
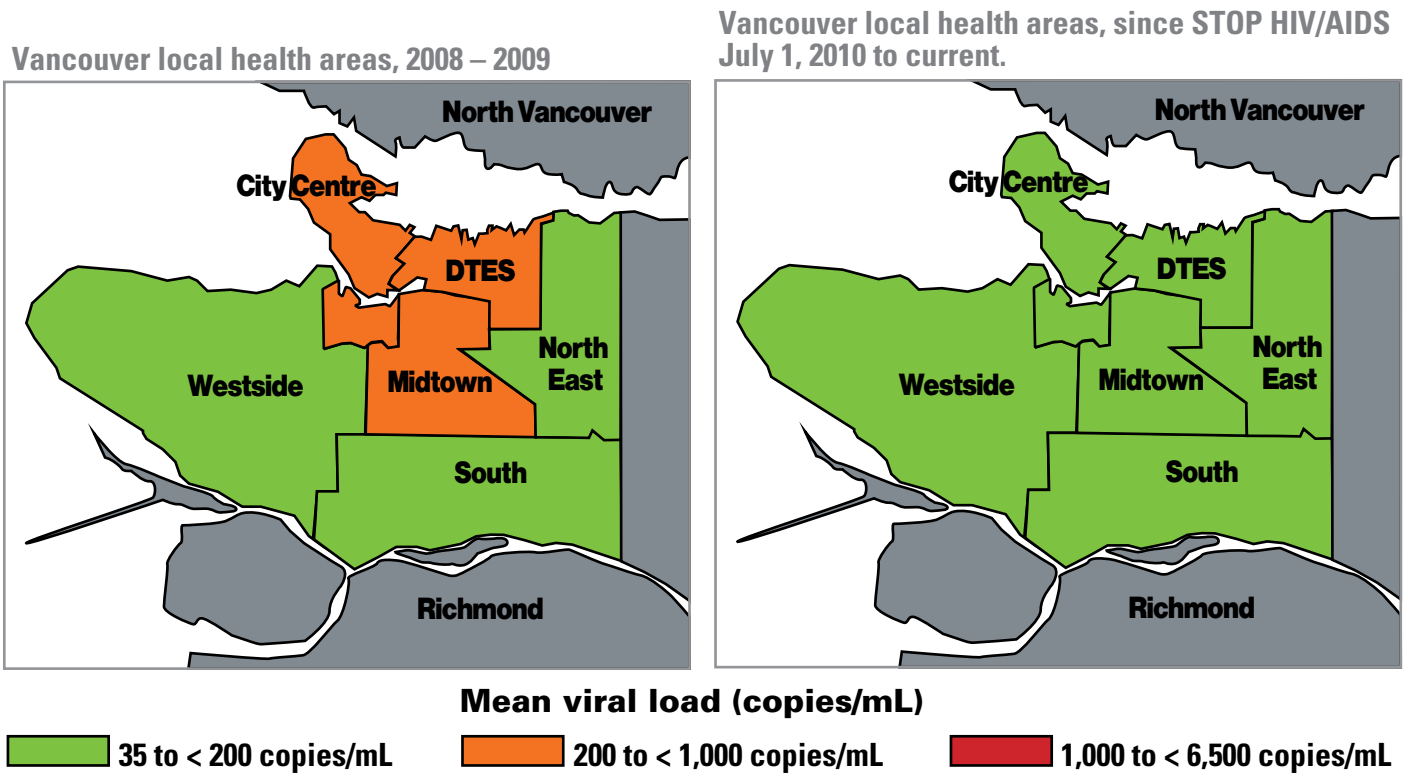


Figure 4.8 **Mean community HIV viral load (copies/ml) for all HIV positive patients in Vancouver, before and after the implementation of STOP HIV/AIDS program through 2012[43]**



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Prepared by: Vancouver Coastal Health, Public Health Surveillance Unit, February, 2013
Spatial source: BC STATS, BC Ministry of Labour and Citizens' Services
Population data source: BC STATS, BC Ministry of Labour and Citizens' Services (Population Estimates).
Data Source: Provincial Public Health Microbiology and Reference Laboratory (Misys Laboratory Database) & Providence Health Care Virology Laboratory.

Successful treatment outcomes for PLHIV depend on measures to keep viral levels suppressed. These stages of HIV-care can be summarized as follows: 1) HIV diagnosis, 2) Linkage to HIV care, 3) Retention in HIV care, 4) Taking ART and 5) Achieving a suppressed viral load. An interruption between any of these stages can lead to an increase in viral load and risk of HIV transmission. VCH and FH maintained relatively higher levels of HIV suppression in 2013, with over 60% of HIV diagnosed individuals successfully suppressing HIV to undetectable levels; but this suppression rate was below 40% in NH. Individuals with a history of IDU demonstrate lower success rates in maintaining HIV suppression (56.9%) compared to non-IDU individuals (69.3%). Success rates are much lower for individuals who do not identify their IDU status (28.3%)[57]

AIDS

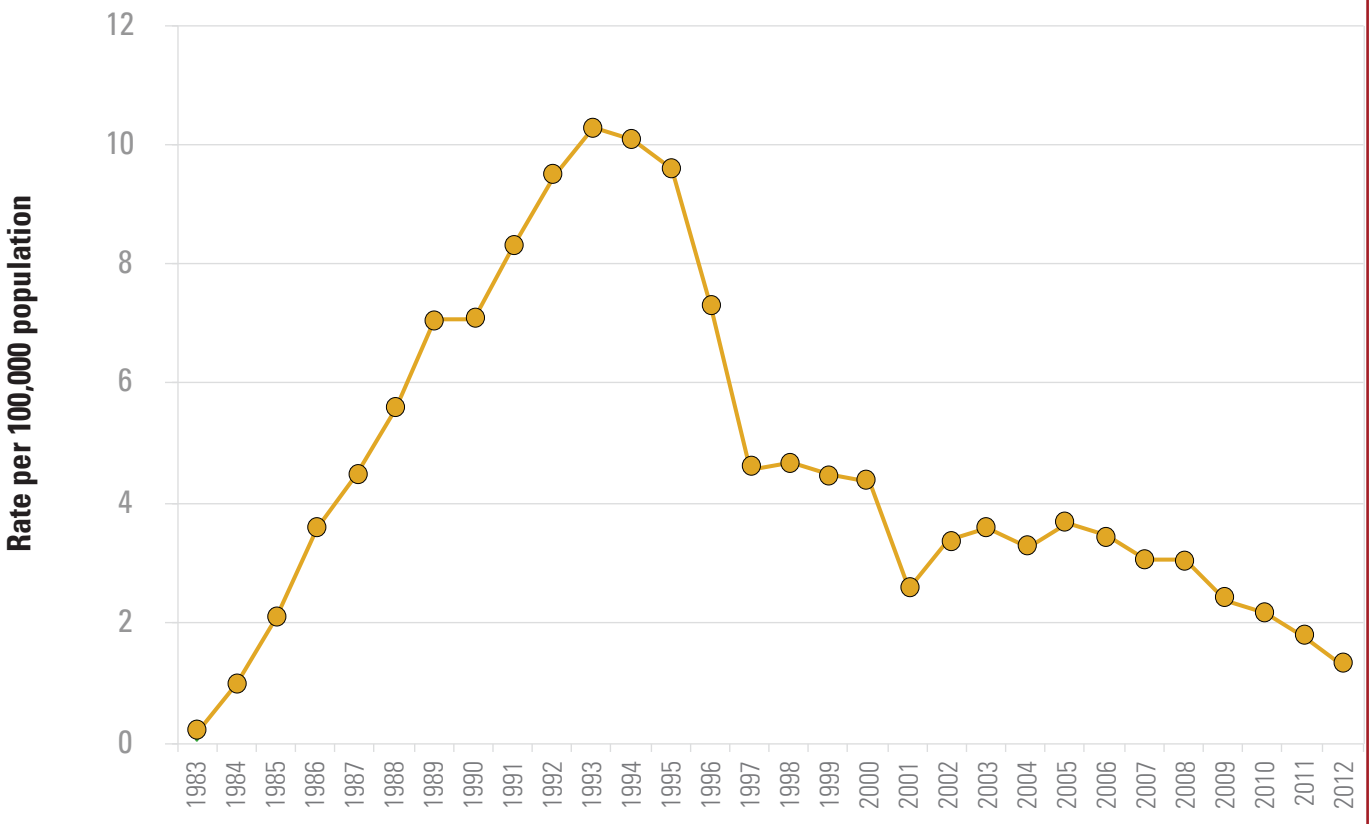
The AIDS diagnosis rate in BC has steadily declined since 2007, reflecting the trend of HIV incidence and improved HIV treatment see Figure 4.9.

Although the total provincial AIDS rate has declined over the last decade, this reduction is not apparent within First Nations subpopulations. This indicates that more resources and strategies for culturally appropriate HIV education and awareness for health promotion and prevention need to be implemented. In addition a focus on reducing stigma and increasing culturally appropriate services and screening to reduce the transmission of HIV would be appropriate. Making early testing, treatment, and care more accessible to this community could help prevent HIV opportunistic infections and progression to AIDS. Barriers for Aboriginal people to access and benefit from health services include stigma, geographic isolation, poverty, racism, issues of confidentiality and other social and systemic barriers.[54]

Community ownership and control of HIV and hepatitis C initiatives are essential. Including health care team members, such as Community Health Representatives and Nurses from First Nations communities, in the circles of care in the Regional Health Authorities will foster meaningful engagement and bridge the gaps in the leaky HIV prevention and care cascade for First Nations people living in BC.

In 1997, about one person died of AIDS every day on the AIDS ward at St. Paul's Hospital in Vancouver and there were insufficient beds to care for these patients.[59] In May 2014, St. Paul's Hospital closed its AIDS ward citing that there were not enough AIDS patients to require its continued use.[59,60]

Figure 4.9 **AIDS diagnosis rate in BC, 1983-2012[54]***



*2013 rates are not available. Due to delays associated with the reporting of AIDS cases, published data is a year behind (BCCDC Clinical Prevention Services Division, personal communication, April 4, 2014)

Hepatitis C Virus (HCV)

HCV BACKGROUND

Hepatitis C is caused by the hepatitis C virus (HCV), primarily affecting the liver. About 2% of the world's population (150 million people) are infected with chronic HCV.[61] However, HCV prevalence among PWID globally is estimated to be 51% (7.2 million people).[62] About 250,000 Canadians are thought to be infected with HCV, including 21% who are unaware of their infection until symptoms appear.[63,64] To date approximately 75,000 people in BC have been diagnosed with HCV since 1992; 1.5% of the BC population 60,000 are estimated to be currently living with HCV.[65]

HCV is primarily transmitted through exposure to infectious blood.[60] Before HCV testing was introduced in 1992, HCV was transmitted through blood transfusions and organ transplants[1]. Sharing HCV-exposed needles/syringes and other injecting equipment (e.g. water, cooker, filter) during intravenous drug preparation and use is the most common risk factor for HCV infection. HCV is more easily transmitted than HIV through needle sharing, which explains its high prevalence among PWID.[66] Sharing drug snorting and smoking paraphernalia such as straws and crack pipes may also transmit HCV but less efficiently than injection.[1] The risk of HCV transmission through vaginal and anal sex increases with multiple partners, STI co-infection, HIV infection, and traumatic sex.[1] Tattooing, piercing, pedicure, manicure, medical procedures with unsterilized tools, and sharing of personal hygiene items are also linked to HCV infection.[63] HCV may be transmitted vertically, from an infected mother to her child during birth in 2-5% of cases but is much higher if mother is co-infected with HIV; transmission through breast-feeding has not been established.[1]

The incubation period for HCV is 2 weeks to 6 months (usually 6-9 weeks), but most (80%) infected individuals do not experience symptoms of acute HCV infection - including fever, fatigue, decreased appetite, nausea, abdominal pain and jaundice.[62] About 25% of infections resolve (clear the virus) within several months of infection.[67] Thus the majority of HCV cases develop chronic hepatitis C, which can lead to cirrhosis (up to 20% of chronic HCV cases over 20 years) or liver cancer (up to 6% of chronic HCV cases).[62] 1-5% of chronic HCV patients die from cirrhosis or liver cancer following 20-30 years of disease progression.[62,68]

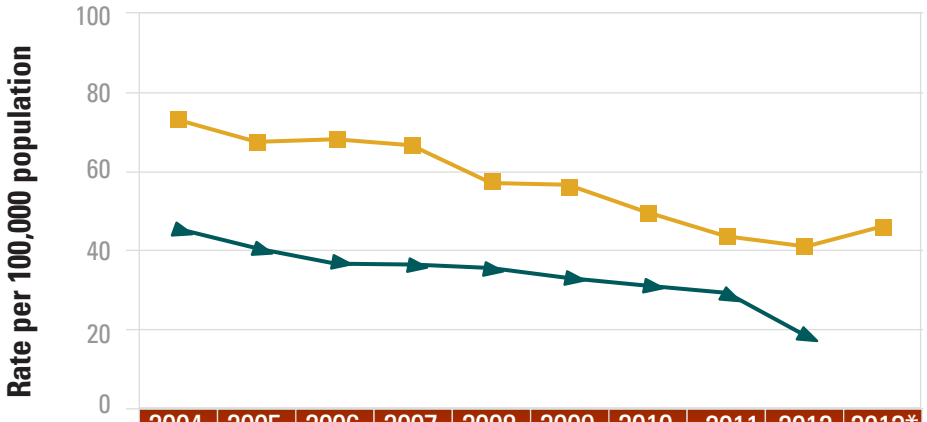
HCV infection is diagnosed by identifying antibodies against HCV (anti-HCV) using an enzyme immunoassay (EIA).[69] However, this does not differentiate individuals who have cleared the virus (spontaneously or through HCV treatment) from those who are chronically infected. Chronic HCV infection is identified by nucleic acid test (NAT), which detects the presence of HCV RNA (the genetic component of the virus). In BC, the Public Health Microbiology Reference Laboratory performs the majority (95%) of anti-HCV testing, as well as all HCV RNA and genotype testing.[69]

Although there is no HCV vaccine available, HCV treatment can eradicate the virus. Treatment success depends on which of the six HCV genotypes an individual is infected with. According to the BC Laboratory Information System, 63% of HCV tested in BC are genotype 1, 36% genotype 2 and 3, and 1% genotype 4, 5 and 6.[1] Pegylated Interferon-α and ribavirin combination therapy is currently the main treatment available in BC today: The sustained virological response (SVR), (i.e. no detectable virus six months after treatment completed) for genotype 2 and 3 is 80% but about 40-50% for the other genotypes with this current treatment. In 2011, "triple therapy" i.e. adding a Direct-Acting-Antiviral (DAA) protease inhibitor to the interferon-ribavirin therapy was shown to improve SVR for genotype 1 patients up to 75% using reduced duration of the therapy.[70,71] HCV treatment is rapidly evolving and it is predicted that within five years, oral treatments with 90% cure rates and minimal side-effects will be available.[73] Boceprevir and telaprevir, the first DAA agents for HCV, have been approved in Canada.[72] Interferon-free regimens using sofosbuvir and ribavirin have also been found effective. These new treatments are reported to have fewer side-effects but are expensive, potentially costing more than $65,000 per complete course.[73]

HCV TREND

Newly identified HCV cases are reportable to public health by the laboratory. Although newly reported HCV cases in BC have steadily declined since the 1997 peak, BC still has the highest HCV rate in Canada (see Figure 4.10). Reported cases of HCV include both recent infections and remote infections (past infections that were identified recently).[74] The increase in HCV cases identified in 2013 coincides with an increase in HCV testing (Figure 4.11). As of 2013, over 2 million HCV tests have been performed in BC. Figure 4.11 shows the number of annual anti-HCV tests performed in BC in relation to the annual number of detected HCV cases. Various local (STOP HIV/AIDS) and international (2012 *US CDC guidelines* advising HCV testing for persons born between 1945 and 1965) testing initiatives have contributed to an increase in awareness and testing, and subsequent increase of cases detected.

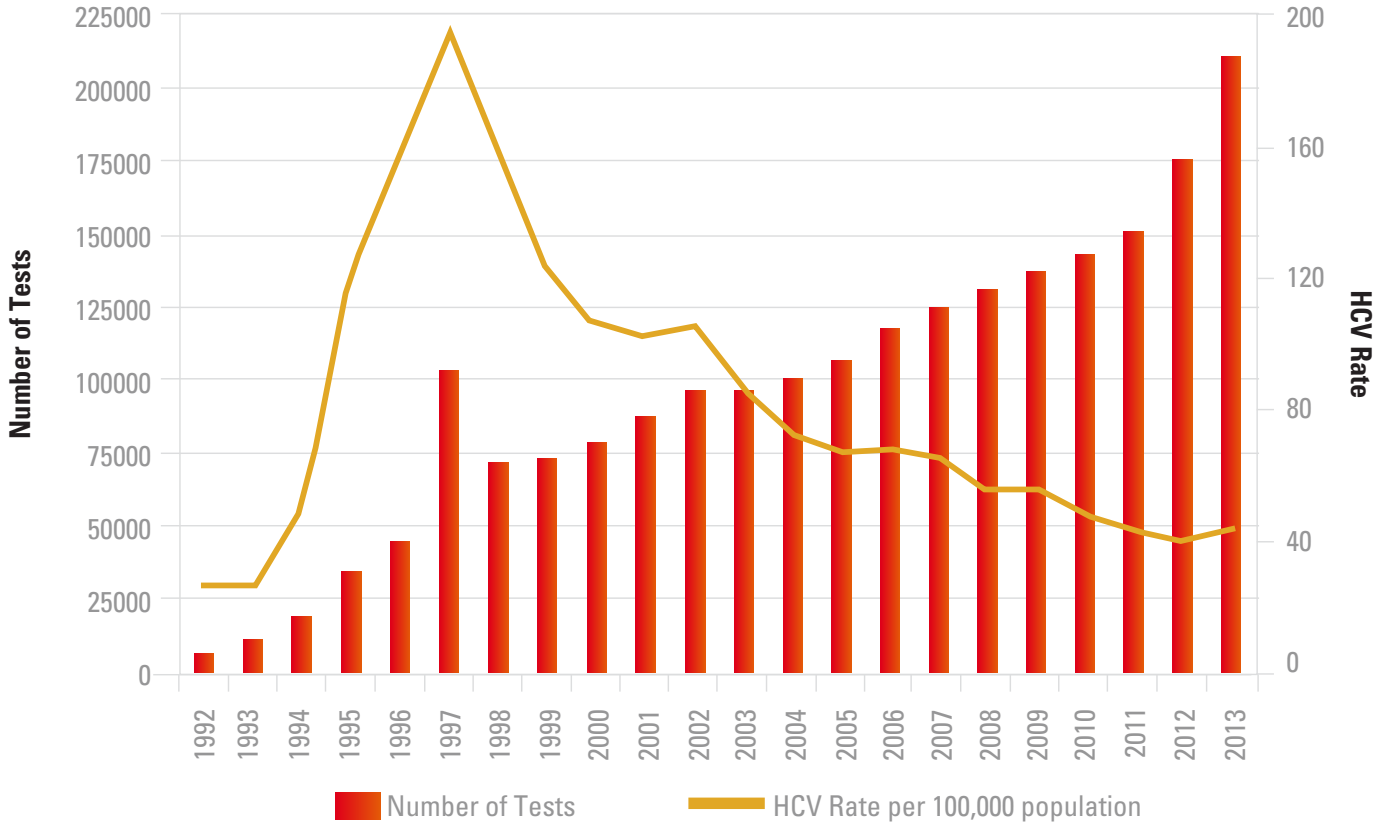
Figure 4.10 HCV rates by year in Canada and BC, 2004-2013[53]



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*
BC Hepatitis C Reports	3042	2832	2903	2879	2509	2476	2217	1970	1886	2105
BC Hepatitis C Rate	73.2	67.5	68.4	67.1	57.7	56.1	49.6	43.8	41.5	45.9
Canadian Hepatitis C Rate	45.2	40.3	36.9	36.6	35.8	33.3	31.1	28.9	19.3	0.0

*2013 Canadian rates are not available. 2013 BC diagnoses and BC rates are preliminary and subject to change
(BCCDC Communicable Disease Prevention and Control Services, personal communication, May 22, 2014)

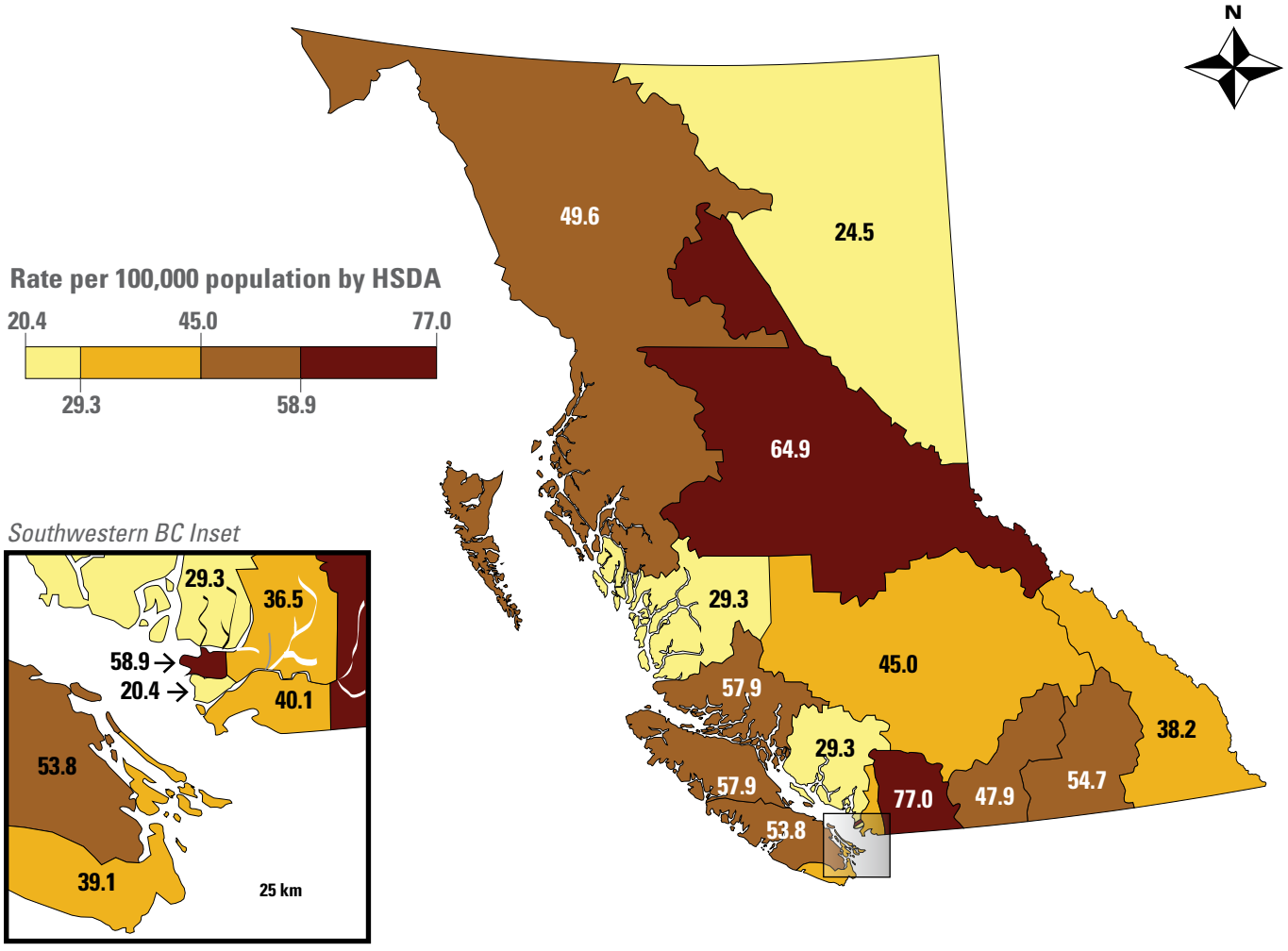
Figure 4.11 Total anti-HCV test volumes and HCV cases, 1992-2013, BC*



*2013 BC rates are preliminary and subject to change
(BCCDC Clinical Prevention Services Division, personal communication, June 19, 2014)

When HCV rates were mapped by HSDA for 2013 (Figure 4.12); Fraser East had the highest HCV rate, followed by Northern Interior, Vancouver, and North Vancouver Island. Richmond, Northeast, and North Shore have the lowest rates. Based on age group (Figure 4.13), HCV rates peak in males in the 40-59 age group, but females have higher rates of HCV than males at younger ages. Women generally use health services more frequently than men and are thus more likely to be tested, and HCV detected. Males dominate the HCV cases after age 30. The highest male rate is in the 40-59 age group when it is over twice the female rate, which reflects the age and sex of PWID in BC.

Figure 4.12 **HCV rate in BC by HSDA, 2013**[53]



HSDA	Rate	Cases
11 East Kootenay	38.2	29
12 Kootenay Boundary	54.7	42
13 Okanagan	47.9	166
14 Thompson Cariboo Shuswap	45.0	98
21 Fraser East	77.0	221
22 Fraser North	36.5	232

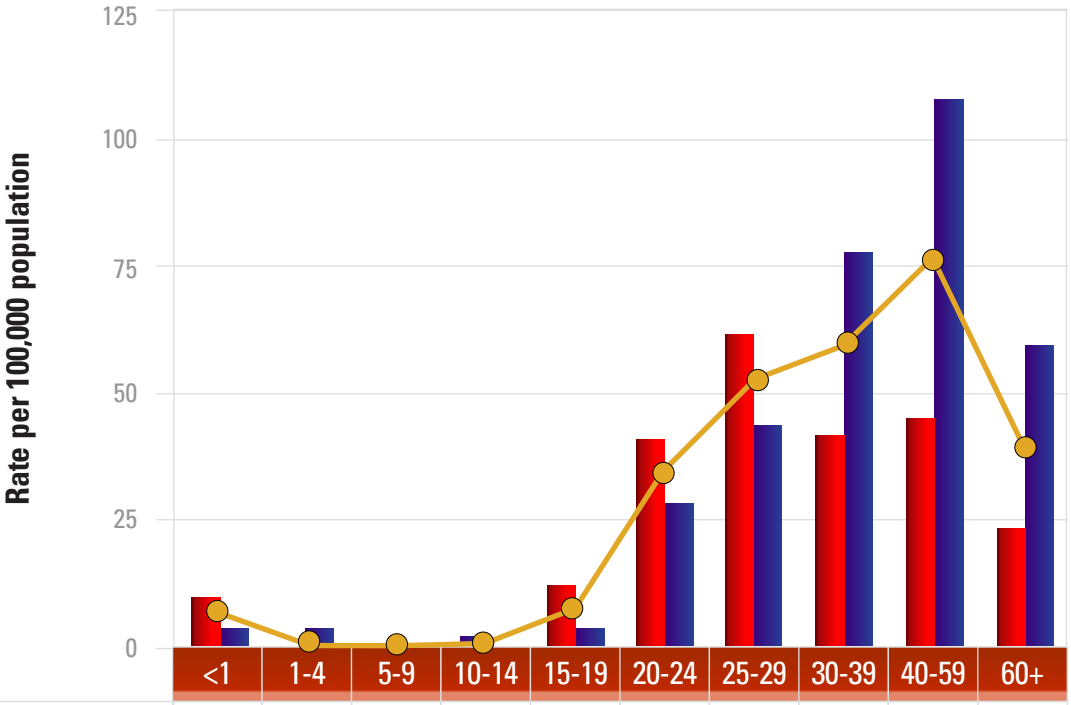
HSDA	Rate	Cases
23 Fraser South	40.1	307
31 Richmond	20.4	41
32 Vancouver	58.9	387
33 North Shore/Coast Garibaldi	29.3	82
41 South Vancouver Island	39.1	145
42 Central Vancouver Island	53.8	141

HSDA	Rate	Cases
43 North Vancouver Island	57.9	69
51 Northwest	49.6	36
52 Northern Interior	64.9	92
53 Northeast	24.5	17

Note: Map classification by Jenks natural breaks method

*2013 BC diagnoses and BC rates are preliminary and subject to change
(BCCDC Communicable Disease Prevention and Control Services, personal communication, May 22, 2014)

Figure 4.13 **HCV rate in BC by age group and sex, 2013[53]***



	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-59	60+
Hepatitis C Rate - Female	9.4	0.0	0.0	0.9	12.6	40.8	62.1	41.6	45.4	23.0
Hepatitis C Rate - Male	4.4	2.2	0.0	0.0	3.4	28.5	44.0	76.9	107.4	59.5
Hepatitis C Rate	6.8	1.1	0.0	0.4	7.8	34.4	53.1	59.1	76.1	40.3
Hepatitis C Reports - Female	2	0	0	1	17	62	97	127	309	126
Hepatitis C Reports - Male	1	2	0	0	5	46	68	231	714	296
Hepatitis C Reports	3	2	0	1	22	108	165	358	1024	422

*2013 BC diagnoses and BC rates are preliminary and subject to change
(BCCDC Communicable Disease Prevention and Control Services, personal communication, May 22, 2014)

RECENT HCV INFECTIONS

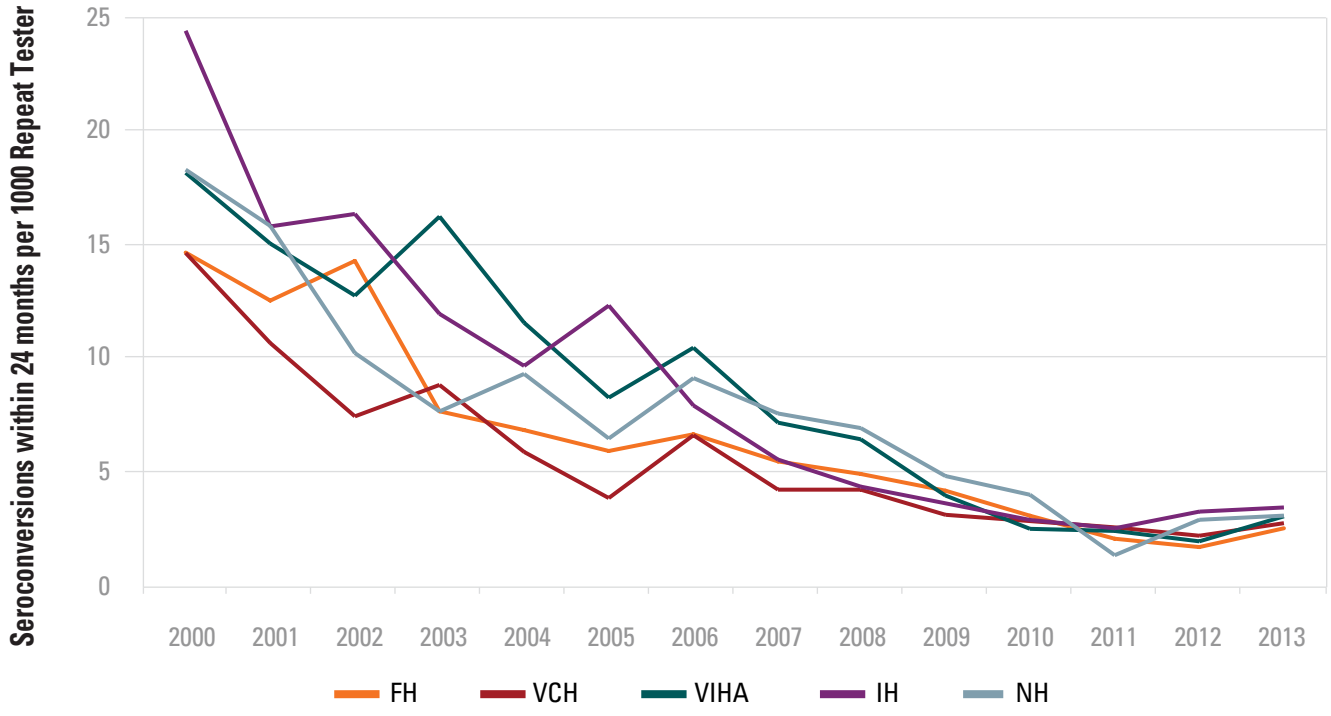
Seroconversion is defined as detectable antibodies after a previous negative test. The Public Health Agency of Canada considers seroconversion within 12 months as an acute HCV case; however, 24 month seroconversion can give a clearer picture of new infections, and is a useful indicator for tracking HCV diagnosis.[72] Figure 4.14 illustrates the trend of 12 and 24 month seroconversions among repeat testers in BC. The overall declining trend in rate of HCV seroconversions detected per 1,000 testers continued into 2013.

Anti-HCV seroconversion rates have declined in all health regions since 2000; laboratory data for 2013 indicate that 24 month seroconversion rates were similar in all HAs (Figure 4.15). IH has the highest rate (3.48 per 1,000 testers) and FH has the lowest (2.60 per 1,000 testers). However, 24 month seroconversion rates in VIHA may be underestimated because HCV negative test results performed at Victoria General Hospital are unavailable for inclusion in this analysis.

Figure 4.14 HCV seroconversions per 1000 repeat testers, British Columbia, 2000-2013

(BCCDC Clinical Prevention Services Division, personal communication, June 19, 2014)

Figure 4.15 Anti-HCV seroconversion rate by HA, 2000-2013.



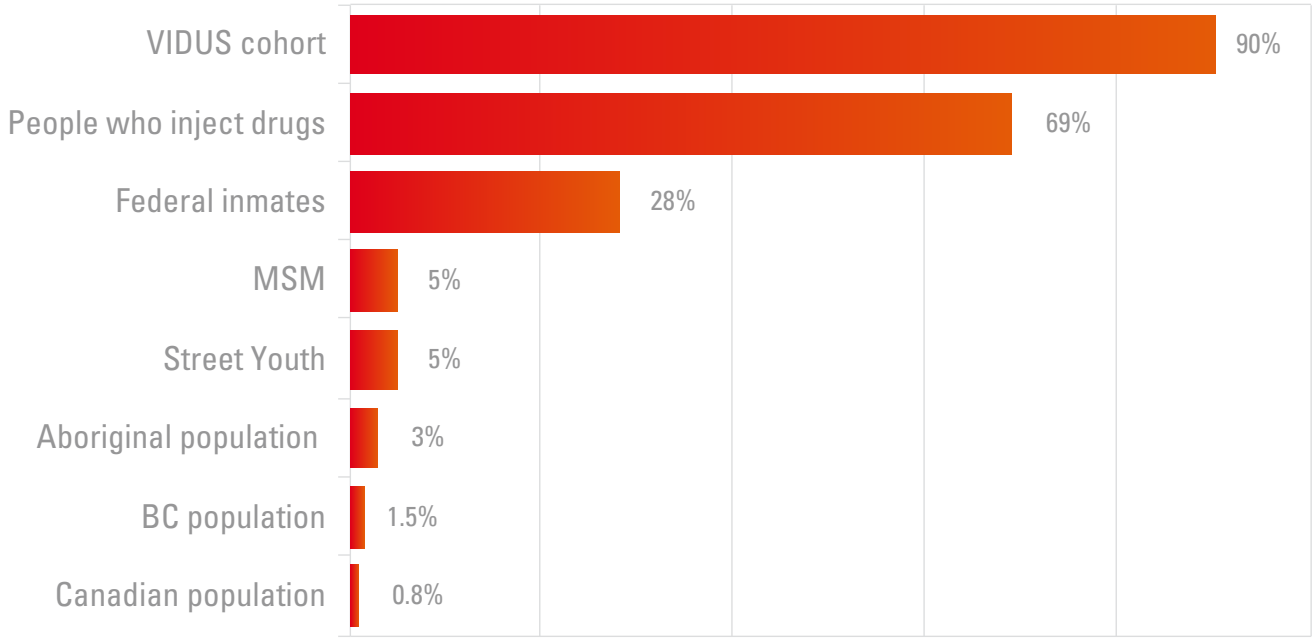
(BCCDC Clinical Prevention Services Division, personal communication, June 19, 2014)

HCV AND INJECTION DRUG USE

According to the Public Health Agency of Canada, about 54-70% of PWID are infected with HCV in Canada. Increased time exposed to IDU and increased frequency of injection (e.g. cocaine with a short half-life may lead to frequent injections), requiring assistance for injecting and co-infection with HIV are associated with increased risk of HCV infection.[64] It is estimated that 48% of people who previously injected drugs are infected with HCV.[64]

HCV estimated prevalence in various subgroups is shown in Figure 4.16. Prevalence of HCV in PWID varies; 69% in I-Track population 2005-2008 in various Canadian cities; in Victoria, BC HCV prevalence in PWID is 62-74% and 83-88% of PWID in Vancouver's DTES.[64,75] Although IDU is strongly linked to HCV infection, social determinants of health, such as income, social status, housing, education, and healthcare accessibility are additional factors that can shape HCV risk behaviour. Furthermore, stigma can be a deterrent to HCV testing, which increases the risk of transmitting the infection.[73] An Australian study found that after adjusting for the broader social determinants of health, none of the individual risk factors (e.g. needle and syringe sharing) had a significant link to HCV infection.[76] Hence, the need for interventions aimed at improving the broader social determinants of health in addition to harm reduction activities.

Figure 4.16 Estimated HCV prevalence in Canada by subgroups[64]



- VIDUS cohort - Vancouver Injection Drug Users Study, UHRI
- I-Track Phase 2 (2005-08) Enhanced surveillance of people who inject drugs, Public Health Agency of Canada (PHAC)
- Infectious Disease Surveillance Correctional Service Canada (2005-06)
- M-Track Phase 1 (2005-07); Enhanced surveillance of men who have sex with men, PHAC available at http://librarypdf.catie.ca/pdf/ATI-20000s/26403.pdf
- E-SYS Cycle 5 (2005-06); Enhanced Surveillance of Canadian Street Youth, PHAC
- Cumulative as of 2007 based on PHAC-Remis modelling

HCV infection rate (i.e. new infections) among PWUD in Vancouver, which includes both injection and non-injection substance use, has declined considerably since 1997 when the rate was 37.1 per 100 person-years to 1.1 per 100 person-years in 2011 (Figure 4.17).[18] Enhanced harm reduction efforts in the DTES, such as needle/syringe and other supply distribution and the supervised injection site and the changing patterns of drug use from injection to smoking, which is less likely to transmit infection (Figure 2.9), contribute to the decline. Prevalence of HCV among established PWID is high; therefore few are susceptible to new HCV infection.[75]

In Canada, 50-90% of HIV-positive PWID are also infected with HCV; in BC, 64% of co-infected males and 73% of co-infected females are PWID.[77,78] Early initiation of HCV treatment for co-infected individuals can postpone or prevent the development of serious liver problems. About half of co-infected individuals in BC were diagnosed with HCV an average 3.5 years prior to their HIV infection.[79]

Figure 4.17 **Incidence of HIV and HCV infection among PWUD in Vancouver, 1996-2011[18]**